LOUISIANA TECHNOLOGY INNOVATIONS FUND PROGRESS REPORT
1 March, 2002
for the period ending 31 December, 2001

I. DEPARTMENT / AGENCY

Louisiana State University, Department of Physics and Astronomy

II. PROJECT TITLE

"Training Today's Students for Tomorrow's Internet Work Environment"

III. PROJECT LEADER

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IV. DESCRIPTION OF THE PROJECT

During this project we will develop a system to provide today's school children with experience in using the internet to control, access and operate robotic instruments much in the way that they may in tomorrow's high technology network based work environment. This will include internet control interfaces for the Highland Road Park Observatory telescope, for the ATIC balloon-borne "space" experiment and for a HAM radio satellite communication system. In addition a group of teacher leaders will work with us to develop a curriculum that will provide the context and structure necessary for students to use these internet accessed instruments effectively. During the project we will partner with various community and business organizations such as HAM radio operators, amateur astronomers, Southern University, LaSPACE, and a local television station to provide needed expertise and to enhance the quality of the product. The final products of this project will include a set of operational internet "robots", the materials necessary to train teachers in the use of these devices, the supporting classroom materials to be used by students, and an evaluation of the project effectiveness based upon classroom assessments

V. PROJECT STATUS

A. Brief Summary

During the period June 2000 through December 2001 there has been very good progress and many of the project goals are close to being achieved. We have established nearly all of the initially proposed hardware / software infrastructure, ordered the auxiliary telescope for LIGO, reprogrammed cost savings to expand the capability of the project, developed the project web site classroom lessons and teacher guide material, held a pilot workshop to train nine teachers in

the use of the internet instruments and classroom material and began evaluating project components in the classroom.

B. Accomplishments

The master project web site server (the ROBIE server) has been moved to its permanent location at the Highland Road Park Observatory (HRPO) along with the HAM radio station equipment and control computer. The project web site, which can be accessed at http://www.bro.lsu.edu/, contains the ROBIE teacher guide material, descriptions of the three "instruments" currently available, and links to the instrument web sites. The ROBIE server is also used to control the workstation cluster, to maintain backups for the system, to provide an archive of ROBIE information and telescope images, and to eventually distribute observation tasks to the telescope network. The ATIC web site (http://atic.phys.lsu.edu/aticweb) and the Radio web site (http://www.bro.lsu.edu/radio) have been completed, have a full complement of lessons, and provide access to the ATIC housekeeping data and the HAM radio system. For example, from the radio web site anyone can listen to the currently tuned frequency, teachers who have been trained in the use of the equipment can tune the radio and/or follow satellite overpasses, and licensed HAM radio operators can use the system for voice and data communication. In recent months an area teacher and the HRPO Supervisor (a former teacher) have received their HAM certification and we expect more to follow.

The initial version of the telescope internet control software has been completed and incorporates a commercial package called "Astronomers Control Program (ACP)". This software provides for control of the observatory functions and for taking images of astronomical objects using the telescope CCD camera. ACP also incorporates its own web interface providing users with the ability to use the telescope with a normal web browser. In addition, ACP incorporates a set of scripts that can be used to automate the telescope for taking images of multiple objects. With this software teachers will be able to logon to the telescope, upload a observing plan, initiate the telescope to automatically image each object and then download all images to their remote site.

The auxiliary telescope that will be placed at LIGO was finally ordered mid-August, 2001. The delay in ordering this custom telescope was caused in part by the change in the project schedule (due to the ATIC Antarctic flight being moved by NASA up one year from 2001 to 2000) and in part by negotiations with LIGO over telescope details. This custom built telescope will require about seven months to fabricate and deliver. Since this telescope and control system is essentially identical to that used at the HRPO, the remote control software nearing completion will be directly applicable. Currently, we are developing a MOU between LSU and LIGO that will specify areas of responsibility as well as procedures for the management and use of this new facility.

Finally, in achieving the current level of success with the project I have realized a significant cost savings and have obtained approval from LTIF to rebudget these savings for the purpose of enhancing the capabilities of this project. Among the new items I will now be able to implement is a low cost, commercial technology remote control telescope system in collaboration with Louisiana School for Math, Science and the Arts in Natchitoches, LA,

improve the HAM radio capability, enhance the teacher workstation cluster capability, provide a couple of portable, computer controlled telescopes for teacher / classroom instruction and establish a radio telescope as a fourth ROBIE instrument. During this period I also received LTIF approval for a no-cost extension of the project termination date to June 30, 2002. No changes in the appropriation for this project were requested or required as a result of this no cost extension. This no-cost extension will allow the new equipment to be ordered, received and installed as well as will allow a complete evaluation of the ROBIE telescope unit to be incorporated into the project final report.

During the summer we held a pilot workshop to train a group of teachers in the use of the ROBIE instruments, classroom lessons and materials. This workshop was held July 30 through August 1 and included 9 teachers who had previously participated in the LSU Department of Physics & Astronomy PLATO program. Prior to attending the workshop all teachers plus their school administration agreed to test the ROBIE material in their classrooms. To fit this special project into existing curriculum we had to distribute the three project units over the academic year. During fall, 2001 the teachers will work with the ATIC balloon experiment, during winter, 2001-2002 they will use the HAM radio system and during spring, 2002 they will focus on the telescope instrument. At the end of each unit, evaluation material from each teacher participant will be collected and analyzed. The evaluations we receive will allow us to judge the effectiveness of ROBIE, to update the classroom material as necessary, and will become a significant part of the final project report. Support for this part of the ROBIE project is provided by Louisiana State University, NASA and other funds separate from LTIF.

During fall, 2001 the group of teachers trained during the summer workshop implemented the ATIC balloon experiment lessons in the classroom. Following the classroom work the teachers filed a report evaluating the ATIC component including how many classes and students participated, which lessons were tried, how well the students did and what kinds of problems came up. While we are still in the process of collating the data, the general impression appears to be very positive. A similar evaluation will also be done for the HAM radio and Telescope components and final results will be included in the project final report.

While the ATIC balloon experiment component was being tested in the classroom, Bill Rodman completed a 50-minute documentary on scientific ballooning and the ATIC experiment. This documentary was aired on WAFB TV in Baton Rouge during September 2001 and was provided to LSU as an educational resource for teachers. Copies of this video were distributed to the ROBIE where it was viewed in the classroom and well received. While no LTIF funds were directly used to produce the documentary, its development was justified, in part, to support this program and as a result LTIF is listed in the trailing credits.